

PATENT APPLICATION No. 10/660,976
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Amendments to the Claims

Amendments to the Claims

- 1 1. (Original): A laser light source comprising:
2 a cage defining a cavity formed from a plurality of self-assembling protein molecules,
3 and
4 one or more cargo elements located within the cavity, wherein at least one of the cargo
5 elements defines a cavity that contains a fluid and or a quantum dot,
6 wherein the cargo element cavity and or its contained fluid internally reflects one or more
7 wavelengths of light in response to an electromagnetic excitation
8 and
9 wherein the laser light source emits one or more photons of light in response to
10 a stimulus deforming the cargo element cavity.
- 1 2. (Original): A laser light source according to claim 1 comprising,
2 receptors for capturing and positioning cargo elements within the self-assembling protein
3 cavity.
- 1 3. (Original): A laser light source according to claim 2 comprising,
2 a vesicle located within the cage and enclosing one or more cargo elements, wherein the
3 receptors extend through the vesicle to capture and position a cargo element within the
4 vesicle.
- 1 5. (Original): A laser light source according to claim 3 comprising,
2 adaptors disposed between the receptors and the cage and binding to the receptors.
- 1 6. (Original): A laser light source according to claim 1 comprising,
2 a vesicle located within the cage and enclosing one or more cargo elements.
- 1 7. (Original): A laser light source according to claim 1 comprising,
2 molecular tethers for capturing and positioning one or more cargo elements within the
3 cavity.
- 1 8. (New): A laser light source according to claim 1 comprising,
2 a functionalized cage for attaching one or more elements externally to the cage.
- 1 9. (Original): A laser light source according to claim 1 comprising,

2 direct cage bonding for capturing and positioning one or more cargo elements within the
3 cavity.

1 10. (Original): A laser light source according to claim 1 further comprising, receptors,
2 molecular tethers and direct cage bonding for capturing and positioning one or more
3 cargo elements within the cavity.

1 11. (Original): A laser light source according to claim 1 further comprising, one or more
2 cargo elements forming a non-permeable cavity.

1 12. (Original): A laser light source according to claim 3 further comprising, a vesicle forming
2 a non-permeable cavity.

1 13. (Original): A laser light source according to claim 3 comprising,
2 a vesicle defining a cavity located within the cage, wherein a fluid and or a quantum dot
3 are contained in the vesicle cavity.

1 14. (Original): A laser light source according to claim 1, wherein the cage is electrically
2 neutral and inhibits charge transfer between the cage and its enclosed cargo elements.

1 15. (Original): A laser light source according to claim 3, wherein the vesicle is electrically
2 neutral and inhibits charge transfer between the vesicle and its enclosed cargo elements.

1 16. (Original): A laser light source according to claim 4, wherein the receptors and adaptors
2 are electrically neutral and inhibit charge transfer between the vesicle and cage and their
3 enclosed cargo elements.

1 17. (Original): A laser light source according to claim 1, wherein the cage reduces
2 contaminant background radiation to cargo carried within the cage.

1 18. (Original): A laser light source according to claim 3, wherein the vesicle reduces
2 contaminant background radiation to cargo carried within the vesicle.

1 19. (Original): A laser light source according to claim 1 comprising, a self-assembling
2 framework of cages to structurally support one or more self-assembling light sources.

1 20. (Original): A laser light source according to claim 1 comprising a self-assembling
2 electrically neutral substrate of cages to structurally support one or more self-assembling
3 light sources.

1 21. (Original): A laser light source according to claim 1 comprising, a self-assembling
2 framework of cages to structurally order one or more self-aligning light sources.

- 1 22. (Original): A light source according to claim 1, wherein the one or more cargo elements
2 is a single cargo element comprising a cargo element that defines a cavity that contains a
3 fluid and or a quantum dot.
- 1 23. (Original): A light source according to claim 1, wherein the one or more cargo elements
2 are a plurality of cargo elements.
- 1 24. (Original): A light source according to claim 22, wherein the plurality of cargo elements
2 are light source cargo elements.
- 1 25. (Original): A light source according to claim 22, wherein the plurality of cargo elements
2 are non-light source cargo elements
- 1 26. (Original): A light source according to claim 22, wherein at least some of the plurality of
2 cargo elements are light source cargo elements.
- 1 27. (Currently amended): A light source according to claim 22, wherein at least some of the
2 plurality of cargo elements are non-light source cargo elements
- 1 28. (Currently amended): A laser light source according to claim 1, wherein the cargo
2 elements respond to stimuli internal and or external to the cage.
- 1 29. (Currently amended): A laser light source according to claim 3, wherein a vesicle and its
2 contained cargo elements respond to stimuli internal and or external to the vesicle.
- 1 30. (Original): A laser light source according to claim 1, wherein the cargo element-
2 contained ARC fluid and or the vesicle-contained fluid contains one or more dyes of any
3 suitable type, with or without scattering particles, or with or without other dopants.
- 1 31. (Original): A laser light source according to claim 22, wherein a subset of the cargo
2 elements include one or more liquids without dopants or with one or more dopants.
- 1 32. (Original): A laser light source according to claim 22, wherein a subset of the cargo
2 elements include a gas or vapor without dopants or with one or more dopants of any
3 suitable type.
- 1 33. (Original): A laser light source according to claim 1, wherein a cargo element cavity
2 containing one or more quantum dots comprise a photonic dot.
- 1 34. (Original): A laser light source according to claim 3, wherein a vesicle cavity containing
2 one or more quantum dots comprises a photonic dot.
- 1 35. (Original): A laser light source according to claim 1, wherein the internal or external
2 deforming stimulus includes one or more stimuli of any suitable type, including but not

- 3 limited to mechanical, chemical, fluidic, biological, photonic, thermal, sonic, and
4 electrical or electromagnetic stimuli.
- 1 36. (Original): A laser light source according to claim 1, wherein a spherical cargo element
2 cavity and or a spherical vesicle cavity is deforming in response to an external stimulus,
3 and the so deformed spherical cavity is an asymmetric resonant cavity (ARC)
- 1 37. (Original): A laser light source according to claim 1, wherein a spherical fluid droplet
2 contained within a spherical cargo element cavity and or contained within a spherical
3 vesicle cavity is deformed in response to a deformed cargo element cavity and or to a
4 deformed vesicle cavity, and the so deformed spherical droplet thereby becomes an
5 asymmetric resonant cavity (ARC).
- 1 38. (Original): A laser light source according to claim 1, wherein the ARC deforms from a
2 first geometry to a second geometry and the wavelength of the one or more photons is
3 dependent on the second geometry.
- 1 39. (Original): A laser light source according to claim 1, wherein selectable quantum dot
2 energy emissions are used to tune the Q-value and resonant frequency of the ARC
3 photonic dot.
- 1 40. (Original): A laser light source according to claim 1, wherein the Q-value (whispering
2 gallery modes) and resonant frequency of the laser are tunable by using an ARC.
- 1 41. (Original): A laser light source according to claim 1, wherein the ARC is a Q-switched
2 laser.
- 1 42. (Currently amended): A laser light source according to claim 1, wherein the laser light
2 source is ~~an ultrabright~~, a tunable source of light.
- 1 43. (Original): A laser light source according to claim 1, wherein there is the ability to couple
2 a high-Q/whispering gallery mode out of the ARC with strong directionality
- 1 44. (Original): A laser light source according to claim 1, wherein it operates at an ultralow
2 threshold.
- 1 45. (Withdrawn):
- 1 46. (Currently amended): A laser light source according to claim 1, wherein the laser light
2 source is a ~~therapeutic~~ single task and or multitask in vivo and or in vitro agent.
- 1 47. (Withdrawn):
- 1 48. (Withdrawn):

- 1 49. (Withdrawn):
- 1 50. (Original): A laser light source according to claim 1, wherein the cage is bioengineered in
2 whole or in part.
- 1 51. (Original): A laser light source according to claim 1, wherein the self-assembling protein
2 molecule is a clathrin molecule.
- 1 52. (Original): A laser light source according to claim 1, wherein the cage comprises self-
2 assembling synthetic protein molecules.
- 1 53. (Currently amended): A laser light source according to claim 4, wherein receptors,
2 adaptors, and vesicle comprise natural and or synthetic protein molecules.
- 1 54. (Original): A laser light source according to claim 4, wherein the receptors, adaptors, and
2 vesicle are bioengineered at least in part.
- 1 55. (Withdrawn):
- 1 56. (Currently amended): A laser light source according to claim 3, wherein the vesicle is
2 coated at least partially ~~in a substantially reflective material~~ in one or more materials.
- 1 57. (Currently amended): A laser light source according to claim 1, wherein the cage is
2 coated at least partially ~~in a substantially non-reflective material~~ in one or more materials.
- 1 58. (Withdrawn):
- 1 59. (Withdrawn):
- 1 60. (Currently amended): A laser light source according to claim 4, wherein the receptors,
2 adaptors, and vesicle are at least partially ~~metal~~ coated in one or more materials.
- 1 61. (Original): A laser light source according to claim 1, wherein the cage is greater than
2 about one nanometer in diameter.
- 1 62. (Withdrawn):
- 1 63. (Withdrawn):
- 1 64. (Original): A laser light source according to claim 1, wherein the cage is substantially
2 symmetric with respect to a plane.
- 1 65. (Original): A laser light source element according to claim 1, wherein the cage has
2 substantially icosahedral geometry.
- 1 66. (Currently amended): A light source according to claim 1, wherein multiple light sources
2 are physically and or functionally linked together.

- 1 67. (Withdrawn):
- 1 68. (Currently amended): A laser light source according to claim 1, wherein the laser light
2 source forms a hybrid system upon its physical and or functional integration with
3 elements in vitro and or in vivo.
- 1 69. (Original): A method for forming a light source comprising
2 self-assembling protein molecules into a cage defining a cavity, and locating one or more
3 cargo elements within the cavity, wherein,
4 at least one of the cargo elements defines a cavity that contains a fluid and/or a quantum
5 dot,
6 wherein the cargo element cavity and or its contained fluid internally reflects one or more
7 wavelengths of light in response to an electromagnetic excitation.
8 and
9 wherein the laser light source emits one or more photons of light in response to
10 a stimulus deforming the cargo element cavity.